CHAPTER 8 KEY POINTS

UDOT plans to maximize the existing highway system's efficiency when planning for the future. Intelligent Transportation Systems (ITS) combine technologically advanced methods to improve efficiency and safety while reducing congestion.

UDOT's CommuterLink program uses technology to save lives, time, and money by reducing delays and crashes, facilitating informed traveler decisions, and maximizing capacity of existing roadways. CommuterLink saves over $100 million annually in user costs and continues to meet or exceed its performance goals.

Click here for the UDOT Planning webpage.

Chapter 8
Intelligent Transportation Systems

8.1 Overview

8.1

ITS can "make it work better" and reduce congestion.

Intelligent Transportation Systems (ITS) is the term used to describe UDOT's use of technology to make the transportation system work better. The Federal Highway Administration defines ITS as:

> *Any project that (in whole or in part) involves the application of electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.*

UDOT must maximize the existing highway system's efficiency when planning for the future. ITS uses technology to move more people and goods and to do so more safely. UDOT launched its ITS network, CommuterLink, in 1999 using state funding from the I-15 Reconstruction Project and federal assistance in preparation for the Salt Lake 2002 Olympic Winter Games. Since that time, CommuterLink has saved over $100 million annually in user costs. The following performance illustrates this:

- Freeway delays reduced 36 percent
- Peak-hour freeway speeds increased 20 percent
- Intersection delays reduced 27 percent
- Traffic signal stops reduced 15 percent

The following services and technologies help accomplish this goal:

- Roadside Assistance and Incident Management Teams
- Interagency Coordination (dispatch centers, emergency service providers)
- Traffic Signal Coordination
- Freeway Ramp Meters
- Electronic Variable Message Signs
- 511 Traveler Information Phone Line (voice activated)
- Internet Website
- Closed-Circuit Television (CCTV) Cameras
- Congestion Sensors (intersection monitoring and traffic management)

CommuterLink Know Before You Go

Check out the CommuterLink website for up-to-date traffic information:

www.commuterlink.utah.gov

CommuterLink has saved over $100 million annually in user costs.

- Weather and Pavement Sensors
- Electronic Ports of Entry, Permits, and Credentials
- Collision Avoidance and Lane Departure Warning Systems
- Emergency Phones
- AMBER Alert

Highly trained personnel use CommuterLink technology through three key phases of operation:

- Information Collection
- Information Analysis
- Dissemination and Response

During these sequential phases, personnel and technology work together to detect roadway problems and provide responses that help reduce delays and restore traffic conditions to normal.

UDOT has many partners that share information, technology, and resources. These partners play a critical role in CommuterLink's successful operation:

- Utah Department of Public Safety
- Utah Transit Authority
- Salt Lake City
- Salt Lake County
- Federal Highway Administration
- Federal Transit Administration
- Wasatch Front Regional Council
- Mountainland Association of Governments
- Valley Emergency Communications Center

8.2 Major Focus Areas and Goals

UDOT and its partners recently developed a planning document titled the *ITS Deployment Plan*, located in Appendix E on the CD. This chapter summarizes the ITS Deployment Plan and describes some additional future ITS technologies.

UDOT's first goal for the existing ITS system is to maintain or improve performance measures.

Improved Performance

UDOT's first strategy is to maintain or improve the existing system's performance goals:

- Reduce freeway delays 30 percent
- Reduce freeway accidents 20 percent
- Reduce traffic signal stops 20 percent
- Reduce intersection delays 20 percent
- Increase peak-hour freeway speed 15 percent

UDOT's second goal is to expand the ITS system.

ITS Infrastructure Expansion

UDOT's second strategy is to expand the ITS infrastructure statewide from its current concentration in Salt Lake County. Though ITS is most often associated with urbanized areas, rural areas also benefit from ITS technologies. Public comments received from rural areas during community outreach requested enhanced access to 511 and other CommuterLink services. Expansion projects are identified in the deployment plan.

Future ITS locations are shown in regional maps at the end of this chapter.

UDOT plans to implement some stand-alone ITS projects, but the majority of ITS field infrastructure will be installed as an integral part of traditional construction projects. UDOT intends for all new construction projects to plan ITS infrastructure during design phases and include ITS elements in the construction contracts. Combining ITS installations with other construction projects provides the following benefits:

- Reduced construction impacts due to fewer construction projects
- Avoid digging new pavement
- Reduced engineering costs
- Reduced construction costs
- Accelerated expansion of ITS with public benefits

To facilitate this strategy, UDOT has developed internal department tools for incorporating ITS elements in the conceptual design and construction applications:

- Project design checklist
- Corridor plans
- Regular updates of the ITS Deployment Plan
- ITS planning criteria for projects

Utahns in rural areas identified ITS expansion as a priority, especially where it is necessary to travel through the mountains for health care, shopping, and other essential services. *Source: UDOT 2003 Community Outreach.*

CommuterLink Enhancements

UDOT's third strategy is to continue improving various components of CommuterLink, such as the 511 phone service, Internet website, operator software, interoperability with other agencies, and remote workstation capabilities.

The Future of ITS

The State of Utah is entering an exciting era for transportation. The traveling public continues to express interest in more efficient and individualized transportation. The future of transportation is in the creation of an electronically integrated vehicle and highway system. A cooperative effort is underway between the automobile industry and the United States Department of Transportation to provide vehicles equipped with Intelligent Vehicle Systems (IVS). IVS allows vehicles to talk to each other and to the roadway infrastructure. IVS technology has introduced route guidance and navigation systems, adaptive cruise control, collision avoidance systems, driver condition warnings, vehicle stability, and driver vision enhancement.

Using IVS, vehicles can send information about traffic flow, road/weather conditions, and incidents. This shared information provides transportation managers with real-time operating conditions to manage the existing transportation system more safely and efficiently. Through voice-activated IVS communications, drivers can receive information such as 511 traffic updates, global positioning systems, road/weather conditions, travelers' information resources, emergency communications, and Internet

connectivity. These types of applications focus on providing uninterrupted in-vehicle communication, improving safety measures and commercial vehicle operations, and providing information to improve recreational travel.

A Vision of the Future

A traveler's commute in the near future may be similar to Bryan's experience below:

Bryan enters his vehicle and it asks him for his destination. Bryan responds audibly with his destination. The vehicle then checks road conditions and responds with information about construction, crashes, and current and projected congestion delays. The vehicle route guidance system suggests the quickest route, audibly informs Bryan, and displays a route map.

The vehicle asks Bryan if he wants to receive step-by-step directions as he makes the three-hour recreational trip. Bryan declines, but requests that the in-vehicle computer report to him every 30 minutes. Bryan requests that the in-vehicle system verify his overnight accommodations and confirmation number at his destination.

Bryan begins the trip making his way through local traffic. As he approaches a green light, the vehicle suddenly warns Bryan of another vehicle that is about to run the red light on the cross street. Bryan brakes and avoids a serious collision.

Bryan enters the freeway by merging into a gap created when his vehicle sends a wireless request to the vehicles on the freeway. Once on the freeway, Bryan initiates automated lane guidance and adaptive cruise control, where vehicles on the freeway are communicating with each other to maintain safe driving distances and lane changes.

The IVS advises Bryan of a new crash ahead. Information indicates that the backup from the crash exceeds one mile and the delay is expected to be 15 minutes. An alternate route is determined based on current traffic conditions. Bryan is advised that the alternate route would be five minutes faster. Bryan decides to take the alternate route and turns on the navigational feature for audible step-by-step instructions through the detour.

Later in the trip, the vehicle warns Bryan of heavy fog ahead. He requests local news and weather/road condition information. He learns that heavy fog is detected on two miles of his projected route. As the vehicle approaches the fog, Bryan is advised of a change in speed limit and appropriate speed for the weather conditions. He initiates use of an on-board infrared camera and a heads-up display to improve visibility through the fog.

Bryan arrives safely a short time later at his overnight accommodations.

Safety

The major goal for the transportation industry is to improve safety and operation of the nation's transportation network. Crashes cost more than $150 billion a year and consume a greater share of the nation's health care costs than any other cause of illness or injury. ITS technology offers new safety solutions in the use of intelligent cruise control systems, automatic collision avoidance systems, road departure systems, road condition warning systems, and driver condition warning systems, just to name a few. Emergency responders will be able to immediately detect crashes, respond appropriately, and communicate between the crash vehicle, the response vehicle, and the emergency care facility. IVS uses voice-activated communications to share information and avoid driving distractions.

8.3 Funding

Historically, ITS funding amounts and sources have varied year to year. It is anticipated that future funding will continue at or above historical levels, as shown below. Traditional construction projects will budget up to five percent for ITS elements:

Funding Source	Future Annual Funding ($ Million)
State	$ 0.5 - 2
CMAQ, STP, NHS	$ 4 - 8
Local Agencies	$ 0.5 - 1
Total	$ 5 - 11

Initial funding for the construction and deployment of Utah's ITS infrastructure came from the I-15 project, which allocated $80 million in state funds. Since then, the following sources have continued to support improvements to the ITS system:

- Wasatch Front Regional Council and Mountainland Association of Governments Congestion Management/Air Quality (CMAQ) funds are earmarked to contribute $2.5 million annually through 2008
- Congressional funding earmarks of approximately $2 million per year for ITS elements are discretionary and come with restrictions
- Surface Transportation Program (STP) and National Highway System (NHS) funds (shown above) reflect up to 5 percent of project budgets that have been allocated for ITS elements

The ITS system has proven to be a cost-effective way to improve safety and reduce congestion. Future funding for ITS expansion will continue to produce a significant return on the investment.

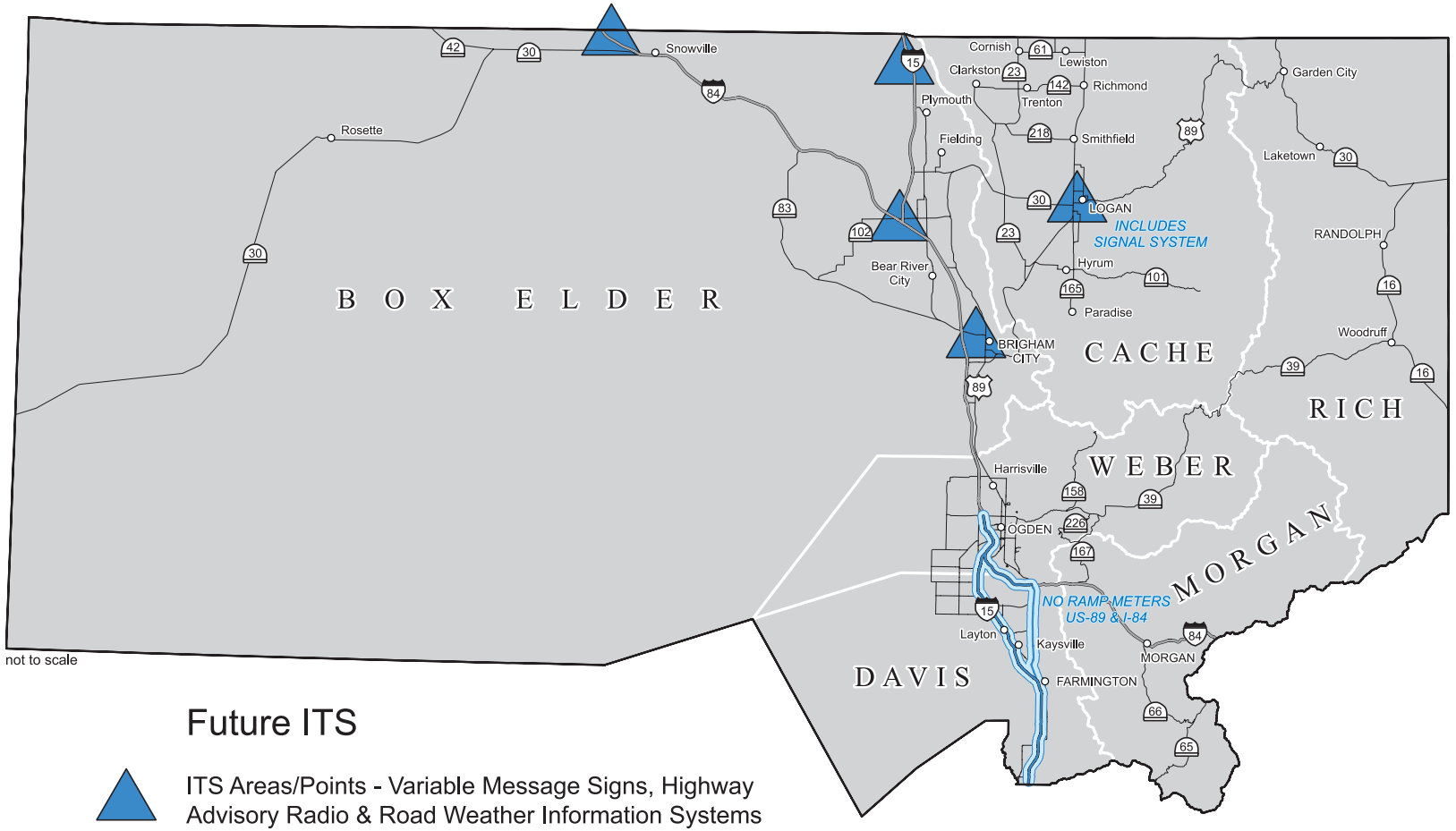
8.4 Recommended Projects

ITS technology is changing rapidly. Future planning of ITS applications will require system flexibility and a concerted effort to understand and apply improved technology, industry standards, and national guidelines. UDOT's goals for the future are:

- Expansion of CommuterLink to provide full coverage along the Wasatch Front and other urbanized areas such as Logan, St. George, and others
- Expansion of rural ITS applications statewide including road weather information systems, enhanced traveler information, and improved emergency response system
- Regional and central control of traffic signals statewide
- Enhanced data sharing with law enforcement and emergency service providers
- Automated safety systems
- Virtual ports of entry
- Enhanced communications in rural areas

REGION ONE

Future Intelligent Transportation Systems



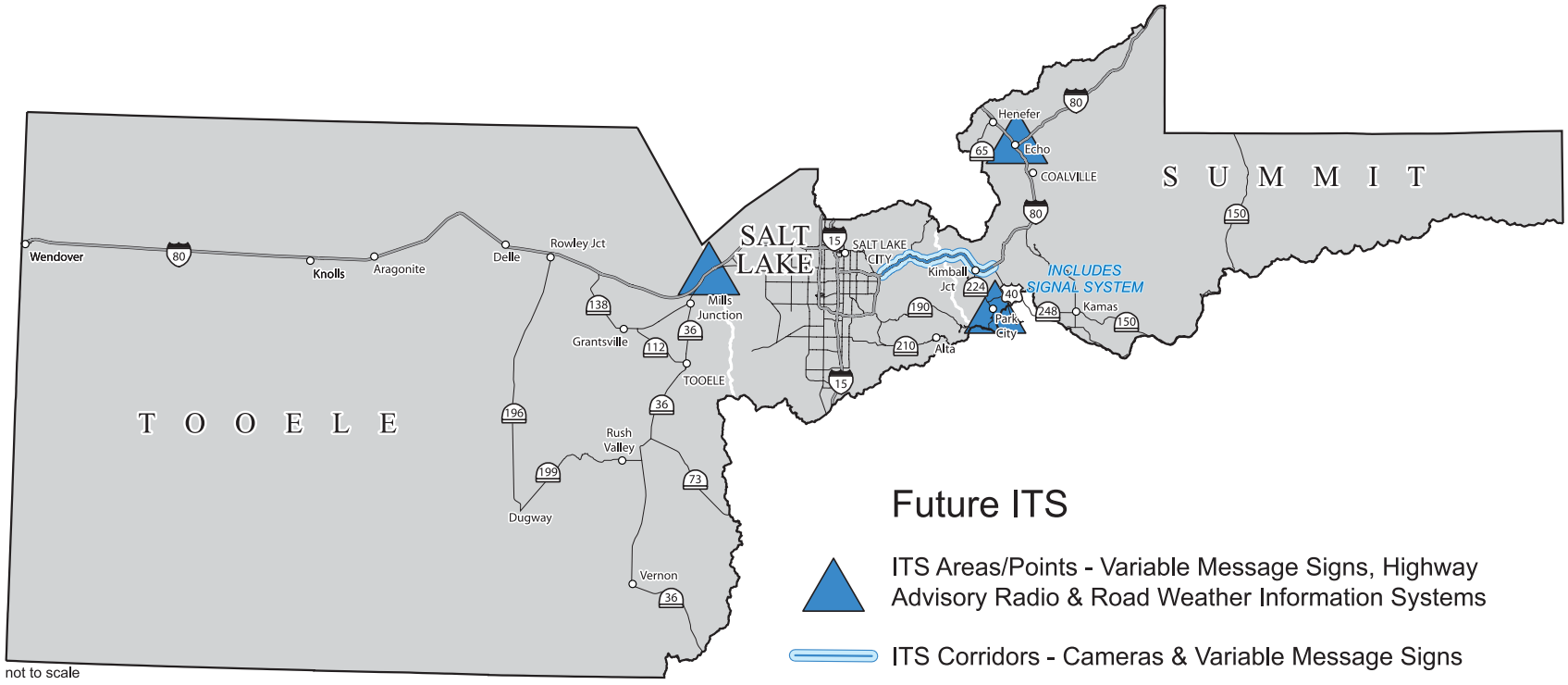
Future ITS

ITS Areas/Points - Variable Message Signs, Highway Advisory Radio & Road Weather Information Systems

ITS Corridors - Cameras, Ramp Meters & Variable Message Signs

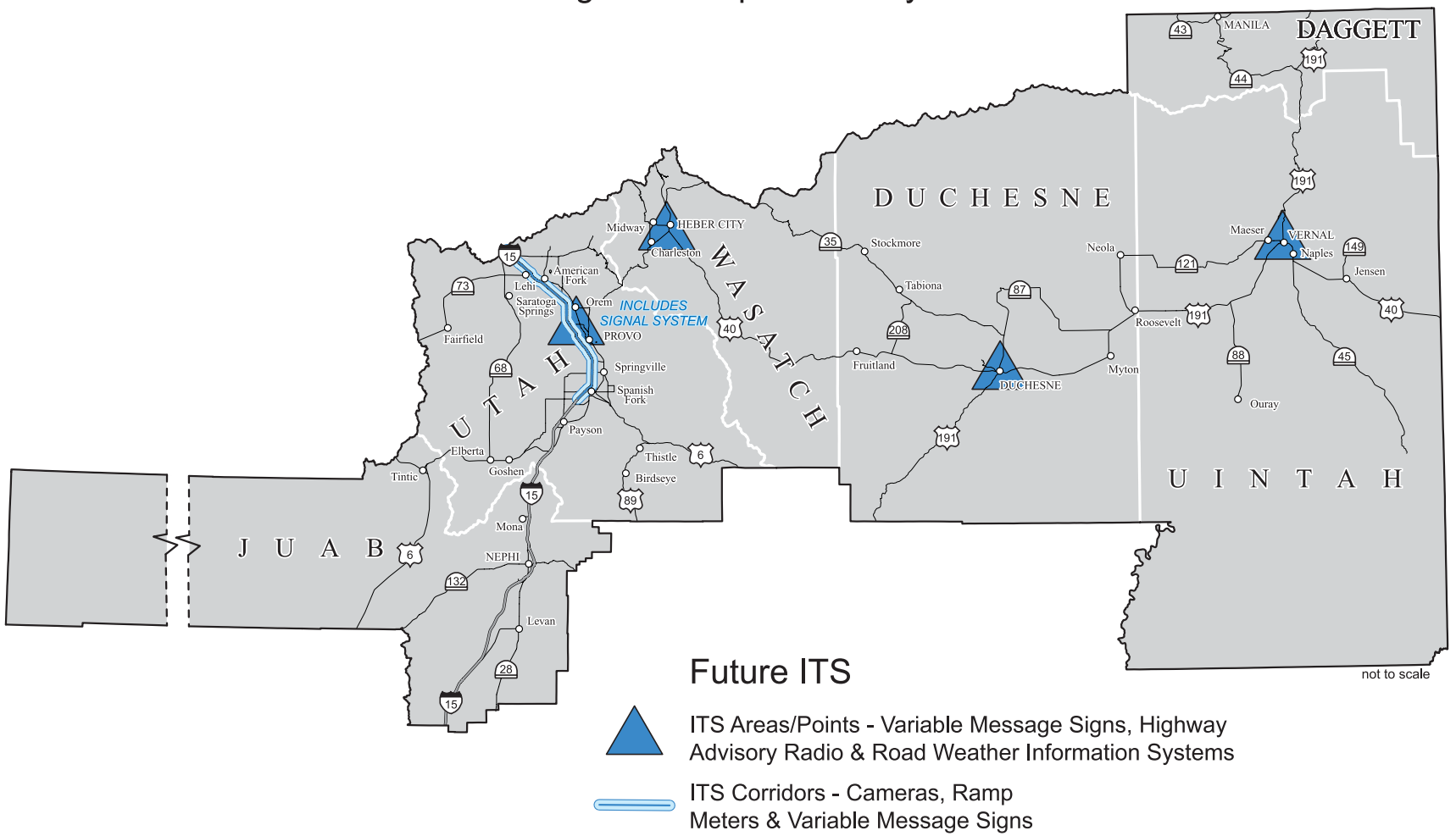
REGION TWO

Future Intelligent Transportation Systems



REGION THREE

Future Intelligent Transportation Systems



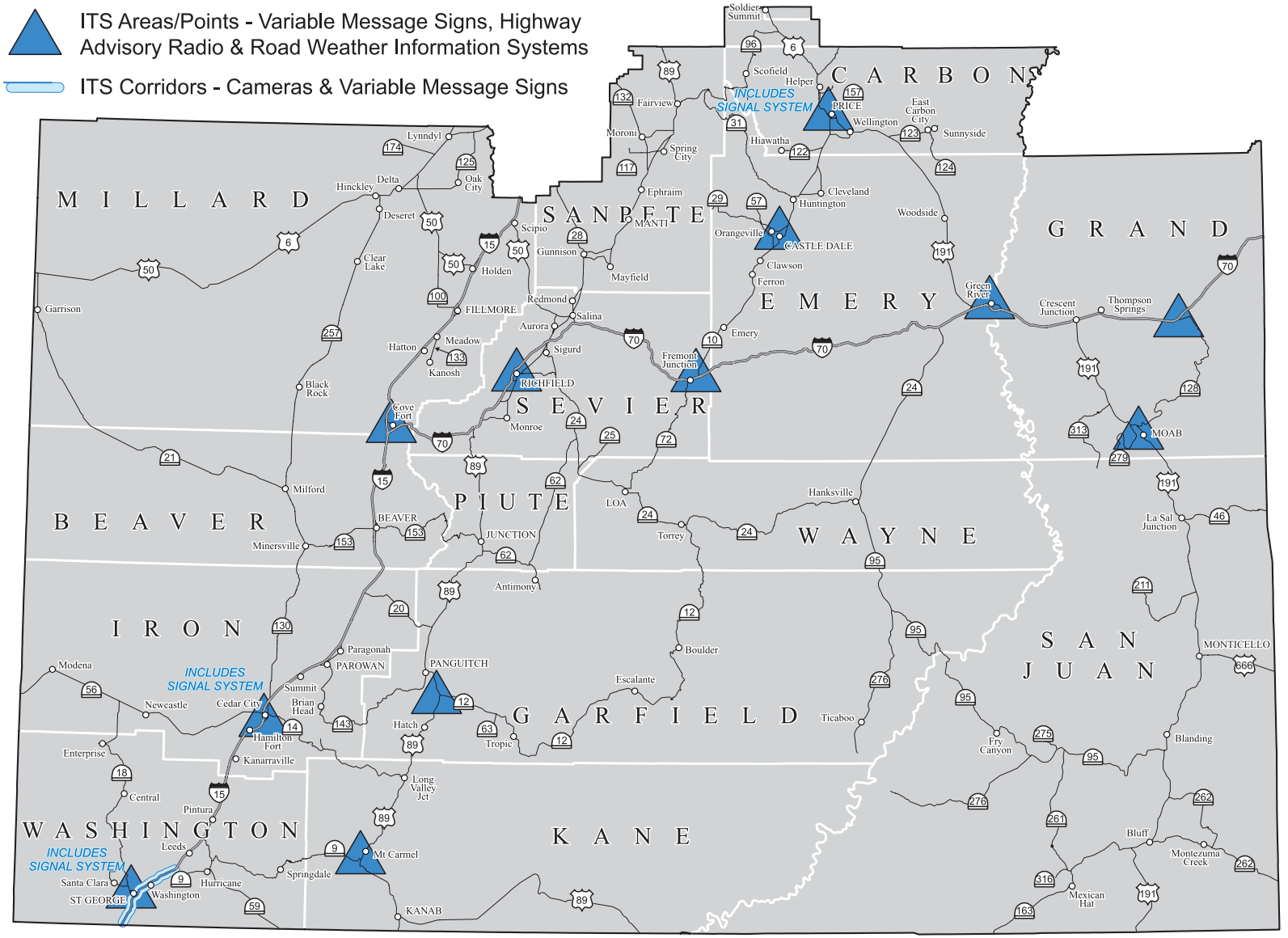
REGION FOUR

Future Intelligent Transportation Systems

Future ITS

ITS Areas/Points - Variable Message Signs, Highway Advisory Radio & Road Weather Information Systems

ITS Corridors - Cameras & Variable Message Signs



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